



Restricted Substances in Colorants and Coatings

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Restricted Substances

- EU REACH SVHC Candidate list
 - Substances of Very High Concern
- EU REACH Annex XVII – “existing restrictions in force”
 - Previously the dangerous substances directive
- EU RoHS Directive
- EU Toy, Vehicle (ELV), packaging and cosmetics directives
- Laws in Japan, China, S. Korea

Restricted Substances

- US States
 - E.g., California – CARB, VOCs, Prop 65
- US Consumer Product Safety Improvement Act
- US EPA – Air, VOCs
- OEM's – Nike, Electronics companies, Yamaha, etc.
- Green labeling, certification programs

RS in coatings and colorants

- Heavy metals in inorganic pigments
- Organic dyes and colorants
- Solvents, VOCs
- Surfactants
- Plasticizers, binders (resins), additives
- Biocides, pesticides, preservatives
- Corrosion inhibitors

Inorganic Pigments

- *EU RoHS, REACH Annex XVII, SVHC, ELV; US state packaging, toys and children's products.*
- Heavy metals
 - Cadmium
 - Hexavalent chromium
 - Lead
 - Arsenic
 - Mercury
- organotins
- Cobalt (SVHC)



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Organic pigments, dyes, colorants

- *EU REACH Annex XVII*
- Azo dyes, colorants
 - Azo dyes which, by reductive cleavage of azo group(s), may release any of 22 aromatic amines
 - Including benzidine
 - In textiles and leather



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Solvents and VOC's

- *EU REACH Annex XVII, SVHC*
- Formaldehyde
- Benzene
- 1 methyl 2 pyrrolidone (SVHC)
- 2-ethoxyethyl acetate (SVHC)
- 2-Methoxyethanol, 2-ethoxyethanol (SVHC)
- *OEM RSLs and Declaration lists*
 - Toluene, xylene, n-hexane, MEK
 - dimethylformamide
 - ethylbenzene, trimethylbenzene
 - dichloromethane (methylene chloride)

Surfactants

- *EU REACH Annex XVII*
- Alkylphenol ethoxylates (APEs) nonionic surfactants
 - Nonylphenol ethoxylates (NPEs)
 - Nonylphenol (NP)
- Substitutes
 - Alcohol ethoxylates
 - UMass Lowell research in progress on safer surfactants using biofeedstocks

Plasticizers, binders, additives

- Phthalates
 - *EU Annex XVII, SVHC, toy restrictions, US CPSIA*
 - Textile screen print inks, resin colorants, paints
 - DEHP, DBP, BBP – not allowed in children's products
 - DiNP, DnOP and DiDP – not allowed in children's products put in mouth
- Short chained chlorinated paraffins
 - Alkanes, C10-13 (SVHC)
- Asbestos
 - Phased out in early 90's as filler in paints

Phthalates commonly used in paints, inks and coatings

Lower molecular wt., not allowed in children's products

- DBP (Di-n-butyl phthalate):
printer inks, dispersion
paints, varnish, nail polish

Use Not restricted

- DEP (Diethyl phthalate):
Printing inks

Higher molecular wt, not allowed for children's products in mouth

- DINP (Diisononyl phthalate):
inks, dispersion paints, varnish
- DIDP (Diisodecyl phthalate):
dispersion paints, varnish,
emulsifiers

Biocides, pesticides, preservatives

- Tributyl tin, organotins as anti-foulants
 - *Treaty - International Marine Organization (IMO) ban*
 - *MA – prohibits TBT for non-aluminum hulls < 25m; disposal of paint, chips or waste into any water body prohibited*
- Silver zeolite, nano-silver

Corrosion Inhibitors

- Chromates (Cr+6)
 - *EU SVHC, Annex XVII*
 - Incl. strontium chromate, lead chromate, etc. (SVHC)
- Lead compounds

Q&A

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Questions for any of the speakers?